This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

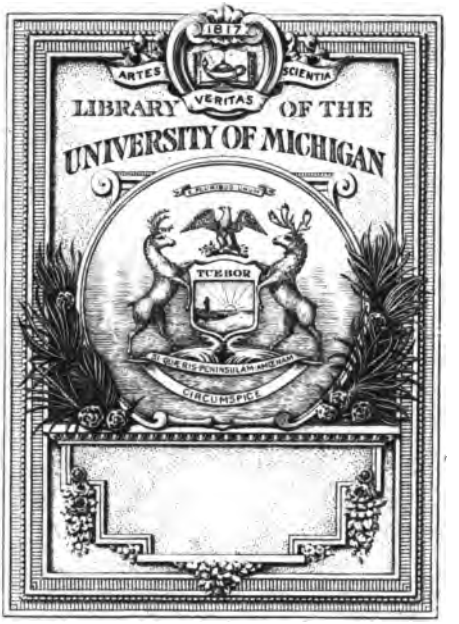
+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`


1817
ARTES
SCIENTIA
VERITAS
LIBRARY OF THE
UNIVERSITY OF MICHIGAN
TUEBOR
CIRCUMSPICE

LIBRARY
5-2

PETER LAW
& SON'S LIS

SB
197
.L43
1850

PARSONS LIBRARY
University of
MICHIGAN

PETER LAWSON AND SON'S LIST.

Edinburgh: Printed, as the Act directs, at the Private Press of PETER LAWSON & SON, No. 1, George IV. Bridge, at the Head of the West Bow.—March 15, 1850.

ON THE

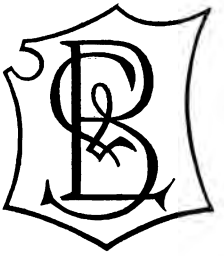
CULTIVATED GRASSES,

AND OTHER

HERBAGE AND FORAGE PLANTS,

ETC., ETC.

THIRD EDITION.



SB
197
.L43
1850

J. Gellatz. Edin.

11613

TREATISE

ON THE

CULTIVATED GRASSES,

AND OTHER

HERBAGE AND FORAGE PLANTS;

WITH THE

KINDS AND QUANTITIES OF SEEDS RECOMMENDED FOR SOWING DOWN LAND TO ALTERNATE HUSBANDRY, PERMANENT PASTURE, LAWNS, ETC.

BY

PETER LAWSON & SON,

SEEDSMEN AND NURSERYMEN TO THE HIGHLAND AND AGRICULTURAL SOCIETY OF SCOTLAND.

EDINBURGH:

PRIVATE PRESS OF PETER LAWSON & SON.

MDCCCL.

PARSONS LIBRARY University of MICHIGAN

TABLE OF CONTENTS.

	PAGE
INTRODUCTORY REMARKS	7
I. CULTURE OF HERBAGE AND FORAGE PLANTS in the Early Ages	8
CULTURE OF HERBAGE AND FORAGE PLANTS in England	9
CULTURE OF HERBAGE AND FORAGE PLANTS in Scotland	13
CULTURE OF HERBAGE AND FORAGE PLANTS in Ireland	14
HERBAGE AND FORAGE PLANTS, Introduction of Species	16
-- -- -- of Varieties	20
DESCRIPTIONS OF TRUE OR NATURAL GRASSES	23
-- CLOVERS OR ARTIFICIAL GRASSES	29
GRASS SEEDS, Remarks on Sowing by Measure and Weight	31
-- Tables of Weight per Bushel and Numbers per Ounce	32
-- Table shewing the depth of Cover at which certain Grasses and Clovers germinate best	33
-- On Sowing with and without a Crop	34
TABLES OF KINDS AND QUANTITIES OF GRASS SEEDS REQUIRED FOR SOWING AN IMPERIAL ACRE :—	
I. For Alternate Husbandry	35
II. For Permanent Pasture, 1st Mixture	36
-- -- 2nd do.	37
III. For Permanent Lawn Pastures, 1st Mixture	38
-- -- -- 2nd do.	39
IV. For Fine Lawns, Bowling Greens, &c., kept constantly under the Scythe	40
V. For Lands in preparation for Irrigation	41
VI. For Pasture and Hay in Orchards, and other Grounds, much overshaded with Trees	42
VII. For Pasturage and Cover in thick shady Woods and Plantations	43

Contents.

Page

TABLES OF KINDS AND QUANTITIES OF GRASS SEEDS REQUIRED FOR SOWING AN IMPERIAL ACRE:—

VIII. For Heathy and Moory Lands which have been Improved with a view to their producing better Pasturage 44

IX. For Improved deep Mossy Ground intended to be kept in Grass .. 45

X. For Marshy Grounds, and those occasionally overflowed by Fresh-Water Tides, &c. 46

XI. For Warrens and Light Sandy Links 47

XII. For dry Gravelly Situations, which resist a Sward from all ordinary means 48

XIII. For Drifting or Blowing Sands 48

On the Cultivated Grasses.

THE Culture of Plants for the food of domestic herbivorous animals, has always been confined to nations distinguished by advancement in the practice of agriculture, and the other arts attendant on civilization: thus, we find that branch of husbandry to have been successfully practised by the Romans in the first century; and in the sixteenth, it was carried on extensively in the Low Countries, then alike famous for agriculture, manufactures, and commerce; whence it was, about the middle of the seventeenth century, introduced to Britain, where its practice may be said to have served as an index to determine the progressive advancement of agriculture from that to the present time. It is therefore hoped, that the following short outline of its history may not be deemed entirely devoid of interest.

Introductory Remarks.

Although the Egyptians, Jews, Greeks, and other eminent nations of antiquity, bestowed considerable care on the culture of the cereal grains, pulse, flax, and various other plants, the products of which conduced to the alleviation of their personal wants, by affording either food or clothing; and although among many of those nations, the possession of flocks and herds was deemed indicative both of power and honour, yet it does not appear that the cultivation of plants for the exclusive purpose of feeding these, was practised prior to the period when Rome swayed the sceptre over the greater part of the then known world,—when her warriors and senators enjoyed, in the culture of their lands, relaxation from the dangers of the battle-field, or the cares of the state; and when, according to an eminent agricultural writer of that age, "the

Early Ages.

Early Ages.

earth delighted to be ploughed with a share adorned with laurels, and by a ploughman who had been honoured with a triumph." Then, in the times which immediately preceded the decline of that mighty empire, the Romans not only grew wheat, far or spelt, barley, beans, &c., for bread, but they also cultivated lucern, red-clover, vetches, lupines, fenugreek, and other leguminous plants, which they used both in a green and dried state for feeding their live stock, and for a like purpose they also employed the turnip and rape; while their horses and working oxen were further regaled with the ripened seeds of the cerealia, as well as those of the bean, pea, and other leguminosæ. But throughout the barbarous ages which succeeded the ruin of the Roman empire, it may, in the absence of any definite information, be safely inferred, that, with the decline of agriculture and the useful arts generally, that portion in the practice of the former, which alone tended to supply the wants of the domestic animals, was the first to fall into disuse; and if the growth of clover, lucern, &c., was at all continued, it must have been so to a very limited extent, and that most likely confined to the countries where their usefulness was formerly most generally appreciated.

Culture of Lucern, &c. by the Romans.

England, 16th and 17th Centuries.

In England, while hemp, flax, hops, and buck-wheat, in addition to common wheat, rye, and barley, were, in the sixteenth century, reckoned common crops; yet the cultivation of forage or herbage plants was only commenced about the middle of the seventeenth century, with the exception of summer* and winter† tares or vetches, which are mentioned by the earliest writers on agriculture. John Gerarde, a famous herbalist, surgeon, and traveller, of the days of Queen Elizabeth, states, in his "General History of Plants," published in 1597, that "the red clover was sown in the fields of the Low Countries, in Italy and divers other places beyond the seas," but makes no mention of its being then known in England; and Sir Richard Weston, who in 1645, published his "Travels in Flanders," mentions that, in the preceding year, he saw a crop of it cut three times in the course of the summer, in the vicinity of Antwerp; and immediately thereafter, seeds of the "Great Clover of Flanders"‡ were advertised "to be had at the shop of James Long, at the Barge on Billings-

Summer and Winter Tares.

Red Clover.

* Vicia sativa *æstiva*. † Vicia sativa *hyberna*. ‡ Trifolium pratense.

England, 17th Century.

gate." In 1653, Walter Blyth, an agricultural writer, was the first to publish particular directions as to its culture; so that the merit of its primary introduction to England is generally ascribed to Sir Richard Weston, who is also believed to have first introduced, from the same country, the field-culture of turnips, on his return in 1645. Sainfoin,* or, as it was first named, French finger-grass, seems next to have claimed attention, being introduced from France in 1651. According to Miller, author of the "Gardener's Dictionary," lucern† was also brought to England, from the same country, in 1657. And Hartlib, in his "Complete Husbandman," published in 1659, recommends the sowing of non-such‡ or yellow clover, under the name of hop-trefoil, from having seen a chalky down in Kent, without any other than a scanty vegetation of this plant, "maintaining many great sheep and very lusty, so that they were even fit for the butcher."

Sainfoin.

Lucern.

Nonsuch or Trefoil.

The seventeenth century is further distinguished in the annals of Husbandry, by the first cultivation of any of the true grasses for hay or pasture, which is thus recorded in Dr. Plot's "Oxfordshire," published in 1677: "They have lately sown ray-grass,§ or the *Gramen loliaceum*, by which they improve any cold, sour, clay-weeping ground, for which it is best, but good also for drier upland grounds, especially light, stony, or sandy land, which is unfit for sainfoin. It was first sown in the chiltern parts of Oxfordshire, and since brought nearer Oxford by one Eustace, an ingenious husbandman of Islip, who, though at first laughed at, has since been followed even by those very persons that scorned his experiments." Succeeding writers, however, do not fail to condemn the rye-grass as an impoverisher of the soil, while they affirmed that its hay was not to be compared to that of clover or sainfoin: the former of which seems alone to have had any particular attention bestowed upon it till the following century. Ray, in his "History of Plants," published in 1688, mentions that the yellow melilot‖ was then sometimes sown for the food of kine and horses; but succeeding writers generally include it among agricultural weeds. And lucern, although introduced, was scarcely, if at all, subjected to field-culture prior to the seventeenth century.

Rye-grass.

Yellow Melilot.

* Onobrychis sativa. † Medicago sativa. ‡ Medicago lupulina.
§ Lolium perenne. ‖ Melilotis officinalis.

England. 17th Century.

Mr Lisle, author of "Observations on Husbandry," written in 1707, states, that, then, clover was commonly cultivated in Wiltshire, Hampshire, Gloucestershire, Leicestershire, &c.; also, that of late years the cow-grass* had obtained some credit as a longer-lived sort than the common clover;" and he further mentions that a neighbour in Hampshire had "sowed the wild white clover† which holds the ground and decays not," the seeds of which he received from Sussex, where its culture was then practised. J. Mortimer, who, in 1721, published his "Whole Art of Husbandry," relates that "in Buckinghamshire they make great improvement of their lands by sowing them with parsley,‡ which prevents the rot of sheep;" and that "one in the hundreds of Essex made a great improvement of some land by sowing of it with mustard-seed,§ for the same purpose."

Cow-grass.

White Clover.

Parsley.

Mustard.

The next novelty in English field-culture seems to have been the whin, as appears by a letter from Colonel Charles Cathcart, to the Scottish Society for Improving in the Knowledge of Agriculture, dated, London, 6th April, 1725, in which he mentions that, "The sowing of whins‖ for feeding of cattle takes mightily about London now;" and that "this improvement comes from Wales, where it has been practised these hundred years." In 1744, William Ellis, a Herefordshire farmer, published his "Modern Husbandman," in which he claims the merit of introducing the culture of the "wild thetch-grass,"¶ or mouse-tare, and the "lady finger-grass,"** or birds-foot trefoil, which he "affirms for truth are the two best sorts of natural meadow-grasses that are for feeding and fattening of conies, deer, race-horses, or any other sort of cattle that will eat them in grass or hay;" and adds, that "if gentlemen knew the value of them they would have no occasion for searching after a foreign spurry†† seed, which I have experienced exceeds all others for its worthless nature;" from which, and other passages, it appears that the culture of spurry was introduced from Holland about 1740. And the same author mentions, that, he "had heard of a gentleman in a distant country who had sowed the plantain-seed,"

Whin or Furze.

Wild Tare.

Birdsfoot Trefoil.

Spurry.

* Trifolium pratense *perenne*. † Trifolium repens. ‡ Petroselinum sativum.

§ Sinapis (species unascertained). ‖ Ulex europæus. ¶ Ervum hirsutum.

** Lotus corniculatus. †† Spergula arvensis.

England, 18th Century.

or rib-grass* but was unable to state the results; which seems the first notice taken by English writers of a plant, that afterwards received much more attention, than, in the present opinion of Agriculturists, its merits ever deserved. In the "Farmer's Complete Guide," published in 1760, attention is directed to the "new lucerne," or sickle-podded medick,† which the writer states to be "a native of Herefordshire and the adjoining counties, but where it is by no means common;" and further adds, that "the Swedes derive great advantages from its culture." Succeeding authors relate that burnet‡ was first grown as a field plant in 1760, or 1761, by Mr. B. Rocque of Walham Green, at the suggestion of Mr. Peter Wyche, to whom belongs the merit of introducing from America, about that time, the timothy-grass,§ first so named in Carolina, from having been taken to that State by a Mr. Timothy Hanson; from which country the culture of the orchard-grass or cocksfoot,‖ was also introduced shortly afterwards; the same Mr. Rocque having grown it in 1764.

Yellow Flowered Lucern.

Burnet.

Timothy-grass.

Cocksfoot grass.

From the preceding, it will be observed with what avidity the earlier cultivators sought out herbage and forage "grasses," as they termed them, among the leguminosæ and other corollaceous plants, and with what seeming care they eschewed the true grasses; their often-repeated reason for which was, that "these produced many small hair-like roots which filled the soil, and, therefore, could not be but very impoverishing and hurtful thereto;" without considering that the then very common practice of cropping a field, as long as it would recompense their labours, and afterwards letting it alone for some years to recover under a crop of unsown grass, was of itself a perfect contradiction to their false theory.

As an approximation, however, to a more improved system, some recommended sowing, along with the clovers for permanent pasture, seeds shaken out of the best natural meadow-hay; without considering that, as the different species composing such hay did not ripen their seeds simultaneously, only a partial reproduction of these species could be expected. But the recommendations of Stillingfleet in 1759, and others immediately thereafter, to cultivate certain of the most useful grasses, as the crested dog's-tail, sweet vernal,

Hay-seeds.

* Plantago lanceolata. † Medicago falcata. ‡ Poterium Sanguisorba.

§ Phleum pratense. ‖ Dactylis glomerata.

England, 18th Century.

meadow fox-tail, meadow fescue, sheep's fescue, rough- and smooth-stalked meadow-grasses, &c., by growing their seeds separately; and the successful introduction from America of the timothy and cocksfoot, directed the attention of practical agriculturists to a new source whence to procure a further accession to their hay and pasture plants; and likewise suggested to agricultural writers the expediency of adopting different terms to distinguish between the clovers and true grasses. Accordingly, we find that, after that period, they generally denominate the former *artificial grasses*, and the latter *natural grasses*.

Crested Dog's-tail.

Creeping Bent-grass. Fine Bent. Sheep's Fescue. Everlasting Pea.

In 1761, Mr Aldworth of Stanslake, collected, at the suggestion of Mr. Stillingfleet, fully a bushel of the seed of the crested dog's-tail grass;* and that author mentions having himself "procured a sufficiency of the same seed, as well as that of the creeping bent,† fine bent,‡ sheep's fescue,§ &c., to begin a stock with." And in the same year, the broad-leaved everlasting pea‖ was grown by a gentleman who, in the "Museum Rusticum" (published in 1765), states that he then sowed a rood of it, which yielded a great deal of feed much relished, both in a green and dried state, by horses and cattle." In 1766, a prize of 5*l.* was awarded by the London Society for the Encouragement of Arts, Manufactures, and Commerce, to Mr. W. Judge, Widford, Essex, "for gathering by the hand the seeds of meadow-fox-tail¶ grass;" as also 5*l.* and 3*l.* 3*s.* to Mr. E. Birch, Somerset, and William Gosse, Hants, for collecting, in like manner, the seeds of crested dog's-tail grass; and in the following year Mr. Gosse received two further premiums for gathering seeds of the meadow-fescue** and sweet vernal grasses.†† The same Society, in 1768, offered a premium of 10*l.* "for the greatest quantity of land (not less than one acre) of vernal grass-seed, sown in drills;" and their gold medal was further offered, in 1769, "to the person who should give the most satisfactory account of the different properties and comparative value of any two or more of the several natural grasses."

Meadow Fox-tail.

Meadow Fescue. Sweet Vernal Grass.

Yarrow or Milfoil.

By earlier authors, yarrow or milfoil‡‡ was generally included among perni-

* Cynosurus cristatus. † Agrostis stolonifera. ‡ Agrostis vulgaris.

§ Festuca ovina. ‖ Lathyrus latifolius. ¶ Alopecurus pratensis.

** Festuca pratensis. †† Anthoxanthum odoratum. ‡‡ Achillea Millefolium.

England, 18th Century.

cious weeds; but a writer in the "De Re Rustica," published in 1769, strongly recommends the sowing of it in sheep pastures. And about 1780, Mr. Boys, a farmer of high reputation in Kent commenced the culture of the rough-stalked meadow-grass;* having had, in 1785, from twenty to thirty bushels of its seed for sale, which he offered at 3*s.* per pound; but was obliged to drop its culture from want of demand. Marshall, in his Rural Economy of Yorkshire, published in 1788, states, that "white or meadow soft grass," now better known by the name of Yorkshire fog,† "was formerly in high esteem, being cultivated separately, and thrashed like corn for its seeds; but it was far from being an eligible grass for cultivation, the growers of the seeds being the only persons who profit thereby, eighty bushels per acre having been produced." But at what period it may have been first cultivated is not recorded. In the last quarter of the same century, the only other introduction of importance seems to have been the chiccory or succory‡ from France, in 1788, by Arthur Young; for though the further cultivation of the natural grasses was strenuously advocated by many able authors, as Curtis, Lord Kames, Dr. Anderson, Martin, and Nodder, in their "Flora Rustica," Young, &c., as well as by contributors to agricultural periodicals, yet comparatively little attention seems to have been bestowed on testing their actual merits by field culture.

Rough-stalked Meadow-grass.

Yorkshire Fog.

Chiccory.

In Scotland, the cultivation of the artificial grasses was much later of being resorted to than in England The date of the first introduction of red clover§ into Scottish husbandry is not ascertained, but is supposed to have been early in the eighteenth century. In a treatise by the Honourable Society for improving in the Knowledge of Agriculture, "published for the benefit of the farmers of that kingdom," in 1724, it is stated that "the people of this country, have of late years begun to follow the practice of sowing grass seeds," of which the writer enumerates the red clover, ryegrass,‖ and hop-clover or trefoil;¶ and recommends, with all or any of the above-mentioned grass seeds, to sow the seeds of good upland or lea hay, particularly the corn grasses of all kinds; as also the white clover,** and narrow-leaved plantain" or rib grass.†† Thomas, the

Red Clover.

Rye-Grass. Hop Clover or Trefoil.

White Clover Rye-grass.

* Poa trivalis, † Holcus lanatus. ‡ Cichorium Intybus.
§ Trifolium pratense. ‖ Lolium perene. ¶ Medicago lupulina.
** Trifolium repens. †† Plantago lanceolata.

Scotland. 18th Century.

sixth Earl of Haddington, and Mr. Cockburn of Ormiston, are supposed to have been the first who cultivated red clover in East Lothian, and that between 1720 and 1730; but even in 1740 the practice had made little advancement. Lord Cathcart, one of the most eminently early improvers, is believed to have introduced the practice into the western counties; he having, in 1733, granted 31 years tacks to his tenants on the baronies of Auchencross and Cathcart, and within the three following years to those in the lands of Craighall, Layland, and parish of Maybole, one of the conditions of which was, that they should be "obliged to sow ten pounds of red clover seed, for an experiment, on half an acre of the first break of their crofting which falls to be grass." Red clover is also reported to have been first sown in Forfarshire in 1755, by a farmer in the parish of Logie Pert, and in Kincardineshire about 1760; while in most northern counties it seems to have been little known, even towards the end of that century. In 1730, Sir William Nicolson, Bart. of Glenbervie, Kincardineshire, by sowing seeds collected promiscuously from natural meadow-hay, among the third or fourth successive crops of oats after lea, was the first in the district of Mearns to make an innovation on the old practice of leaving the land, after being cropped out, to renew its herbage without artificial aid.

Sainfoin. Lucern.

Sainfoin* and lucern,† having, at an early period, attracted a good deal of attention among English growers, it was not to have been expected that they should be entirely overlooked even in this less favourable climate. Accordingly, we find, in the Select Transactions of the afore-mentioned Society, published in 1743, that the Earl of Stair had, for several preceding years, cultivated both, at New Liston, in West Lothian; and the same nobleman is further stated in that work to have "made noble examples, both in Lothian and Galloway, in the practice of turnip, cabbage, and carrot husbandry, by the plough." About the year 1765 to 1770, the sowing of rye-grass, red, white, and yellow clover, with the occasional addition of rib-grass, seems to have become pretty general in the best cultivated districts of Scotland. In 1773, the red or

Red Fescue. Sheep's Fescue.

creeping-rooted‡ and sheep's fescue§ grasses were grown by Dr. Anderson;

* Onobrychis sativa. † Medicago sativa. ‡ Festuca rubra.
§ Festuca ovina.

and about the same period, or shortly after, the then proprietor of Glammis Castle, in Forfarshire, with the view of improving the pasturage about that antient residence, had the parks sown down to permanent grass, with seeds saved promiscuously from hay grown in some of the richest meadows in Yorkshire; and to this day the beneficial effects of the experiment are still evident; and no less striking to the botanist than to the grazier, from the prevalence of *Avena flavescens*, and other grasses, rarely met with in the surrounding country. Towards the end of the century, the fescues, and several others of the permanent natural grasses, as timothy, cocksfoot, Yorkshire fog, &c., began to receive a little attention, arising from the favourably reported results attendant on their culture in the south, and the persevering advocation of their merits, both by agricultural and botanical writers. Scotland, 18th Century.

In Ireland, none of the grasses seem to have been cultivated till after the middle of the eighteenth century. John Wynn Baker, Esq. of Lauchlen's Town, near Lexlip, grew the red clover* about the year 1760, lucern† in 1763, burnet‡ in 1765; and in 1764 he tried an apparently successful experiment with what he called the strawberry clover, which he discovered growing naturally among limestone gravel in the county of Meath,—which, however, from the description he gives, cannot have been the *Trifolium fragiferum*, but more likely the other native strawberry-headed clover, *T. resupinatum*. From the earlier reports on Irish Counties, drawn up by order of the Dublin Society, between the years 1801 and 1808, it appears that, in the county of Cork, red clover was almost wholly unknown in 1795, and five years afterwards rye-grass was still uncultivated. In 1800, red clover was cultivated only by the more intelligent agriculturists in the county of Dublin, and rye-grass was even more sparingly grown. About the same date, red and white clover were crops not cultivated to any extent in Armagh, while rye-grass was totally excluded; timothy grass was grown by way of experiment near Castle Dobbs in Antrim; and in the county of Down the reporter mentions that the cultivated grasses consisted of red, white, and yellow clover, with rye-grass, white-grass, or Yorkshire fog, and a mixture of hay-seeds from the stable-lofts in towns, containing Ireland, 18th Century. Red Clover. Lucern. Burnet. Strawberry Clover. Yorkshire Fog.

* Trifolium pratense. † Medicago sativa. ‡ Poterium Sanguisorba.

Great Britain and Ireland, 19th Century.

a large proportion of soft brome or goose-grass. In 1801, Mr. Wynne of Hazelwood, introduced the culture of lucern into the county of Sligo; and in that and the succeeding year, Sir Richard St George introduced the cultivation of lucern, sainfoin, and chiccory,* into Kilkenny; but the usual crops of that county then consisted of red clover, rye-grass, and white-grass, with soft brome-grass,† for the hay of which the English Dragoon regiments quartered in Ireland are stated to have given 10*s.* per ton more than for any other. It appears, however, to have been generally grown in mixture with rye-grass; and, in the earlier stages of grass husbandry, its culture does not seem to have been limited to Ireland alone, as Withering, in his "British Flora," states that he had seen it in some parts sown among clover; while Curtis and Martyn, both eminent botanical writers, recommend it as being very early, and that "its large seeds make the hay more nutritious." To that early practice of sowing the soft brome-grass, may be traced its present appearance in rye-grass fields, where it is now considered an intrusive weed, indicative of impurity in the rye-grass seed; though like the wild-oat and other indigenous annuals, its presence may at least occasionally be traced to the seeds of former crops retaining their vitality when buried to a certain depth in the soil.

Chiccory.

Soft Brome-Grass.

Since the commencement of the present century, the increased facilities for communication and conveyance have removed the obstacles which formerly limited, for a considerable period at least, the adoption of any new practice or mode of culture to the district in which it might have been originated; so that improvements in Scotland, England, and Ireland, may now be said to go on simultaneously; and therefore, as further separate notices of the introduction of plants to these countries would merely be a repetition of dates, in the following paragraph the most deserving additions which have been made within the past forty years are recorded in their order of priority, without regard to classification under the heads of the different countries, as in those preceding.

Hard Fescue. Smooth Meadow-grass.

The hard fescue‡ and smooth-stalked meadow grasses,§ if not cultivated before the end of the eighteenth century, appear at least to have had a little

* Cichorium Intybus. † Bromus mollis. ‡ Festuca duriuscula.
§ Poa pratensis.

Great Britain and Ireland, 19th Century.

attention bestowed upon them very early in the present, although the exact period, or by whom, has not been ascertained. In 1807, Dr. Richardson of Portrush, Ireland, created a considerable sensation among agriculturists, by the introduction of his famous fiorin* grass, which, as stated at page 12, was cultivated more than forty years before by Stillingfleet, who, in succeeding works of his, endeavoured to impress upon growers the advantages of cultivating it along with the "float fescue, on moist meadow lands," seemingly, however, with very little effect; so that to Dr. Richardson belongs the merit of first acquiring for the fiorin a fair and general trial. About 1820, an extensive set of experiments with grasses, including many exotic as well as native sorts not previously cultivated, was instituted at Woburn Abbey, under the direction of the late Duke of Bedford, the results of which are recorded by the late Mr. George Sinclair, then gardener to his Grace, in his invaluable "Hortus Gramineus Woburnensis," which work may justly be said to have first directed that general attention to the cultivation of useful grasses, so long and unaccountably withheld.

Fiorin or Creeping Bent.

Woburn Grass Garden.

In 1821, the crimson clover† was brought into notice by the late Sir John Sinclair, Bart., and grown in Berwickshire that same year: three years afterwards it was introduced to England, on a much more extended scale, by Mr. John Ellman, jun., of Southover, near Leeds. Mr. Elles of Longleat, in 1826-27, recommended, from experience, the cultivation of the day-lily,‡ as a grateful and early spring food for milk cows. And in 1830, D. Grant, nurseryman at Lewisham, advertised the rough or prickley comfrey,§ which he had discovered to be an agreeable, fast-growing, and nutritious food for both cattle and horses. In 1831, we first introduced the Italian rye-grass,‖ from Hamburgh, and that same year Mr. Thomson of Banchory also brought home a few seeds of it from Munich. The late George Stephens, land-drainer, Edinburgh, introduced the hybrid clover¶ from Sweden in 1834, and in the same year the villous annual vetch** was brought into notice, and recommended as a winter tare, by Mr. A. Gorrie, Annat, Perthshire, who discovered its seeds in a cargo of Dantzic wheat. In 1835, Mr Smith, at Ayr, brought the Siberian cow-parsnip†† under the notice of the High-

Crimson Clover.

Day-Lily.

Prickley Comfrey.

Italian Rye-grass.

Hybrid Clover.

Annual Villous Vetch.

Cow-parsnip.

* Agrostis stolonifera. † Trifolium incarnatum. ‡ Hemerocallis fulva.
§ Symphytum asperrimum. ‖ Lolium italicum. ¶ Trifolium hybridum.
** Vicia villosa. †† Heracleum sibiricum.

Introduction of Varieties.

Blackish Fox-tail-grass. Wood Millet.

land and Agricultural Society of Scotland, as a productive and early spring food for catttle. The blackish-headed foxtail grass* was first recommended in 1839, by a writer in Loudon's "Gardener's Magazine;" and in 1840, the wood-millet† or pheasant grass, a species seemingly destined, when its merits become more generally known, and its culture better understood, to form an important feature in woodlands, was introduced to cultivation by Mr. A. Gorrie.

Tussac-grass.

Since the publication of the first edition of this treatise, several additional grasses have been recommended to the notice of cultivators. Of these, the Tussac grass‡ of the Falkland Islands has attracted the most general attention. This gigantic product of these ungenial regions has been especially recommended for trial on the northern and western coasts and islands of Scotland and Ireland. It was observed in 1842, growing luxuriantly, on peaty, seaward exposures, by Dr. J. D. Hooker, botanist to the Antarctic Expedition, to whom is due the merit of its introduction to Europe, and from whose description the following is an extract:

"This remarkable grass is perennial, and forms, with its densely matted "roots, crowded but isolated hillocks or tumuli, 3 to 6 feet in height, and 3 or "4 feet in diameter, from which the leaves and stems spring. Roots fibrous, "the fibres very tortuous; stems, or culms, numerous, arising from the hillocks, "erect, branched, or divided only at the base, 3 or 4 feet long, smooth, com-"pressed, leafy, and pale yellow, abounding in saccharine matter, and, when young, "esculent even for man."

Several attempts have been made to introduce the Tussac grass into general cultivation on the sea-coasts of this country; but, except in the Orkneys and the Lews, with very indifferent success. Mr. Matheson, of Achany, obtained seeds in 1844, which were sown, the following spring, in various parts of the Lews. In two places only did they vegetate, at Holme and Coll. The soil selected was a deep brown moss, of medium dryness, close to the sea; and the plants made their appearance in the following summer. We examined them in September of the same year, when they shewed every appearance of strength and vigour. The second year the grass produced seeds; the average height attained

* Alopecurus nigricans. † Milium effusum. ‡ Dactylis cæspitosa.

Introduction of Varieties.

by the plants was, however, but three feet. Mr. Matheson states, as the result of his experience, that the Tussac, to insure its flourishing, must be grown at a distance not exceeding a quarter of a mile from the sea, so as to be within influence of the driving spray. Mr. Traill is the only other person known to us who has raised plants from the seed. His experiments were instituted at Woodwick in the island of Rousay, one of the Orkneys, the soil and exposure of which are very similar to those in the Lews. On visiting Woodwick last autumn, we found the plants in a very thriving state. Our own experience leads to the conclusion, that localities within influence of the sea spray, the soil being of a peaty nature, are, without doubt, the best adapted for the growth of the Tussac ; and in such places it is likely to be of great service, as few other nutritive grasses will exist there. In our own nursery grounds it does not thrive well; which may, perhaps, be accounted for by the nature of the soil, which is light and dry. Regarding its value as a forage plant, we have before us an analysis made, at our request, by Professor Johnston, the results of which shew that " the Tussac grass ought to be very nutritive." Propagation in the absence of seed, is easily effected, under favourable circumstances, by subdivision of the roots.

Numerous additional species of grasses and other herbage plants have been brought into cultivation within the last twenty or thirty years, which are not included in the preceding enumeration, from the dates not having been ascertained. Of these may be mentioned, wood meadow-grass,* nerved-seeded meadow-grass,† various-leaved‡ and darnel-spiked§ fescue-grasses, float-fescue or floating sweet grass,‖ Oriental bunias or hill-mustard,¶ Moliner's clover,** &c.

In the preceding, the introduction of species has chiefly been recorded; and, as far as regards the indigenous plants, it does not appear that much improvement remains to be effected by the further introduction of these, although important results may be anticipated from extending the field-culture of many of those valuable species, which may be said to have hitherto only formed subjects of experiment. As, however, the cultivation of original species constitutes only the first steps in the improvement of plants, it is, therefore, to the selection

* Poa nemoralis. † Poa nervata. ‡ Festuca heterophylla.
§ Festuca loliacea. ‖ Glyceria aquatica. ¶ Bunias orientalis.
** Trifolium Molineri.

Introduction of Varieties.

of permanent varieties of these, distinguished from their origins by the possession of superior qualities, as greater growth, earlier maturity, adaptation to particular purposes, &c., that we are ultimately to look for the most beneficial results. It must be kept in mind, however, that, although much remains to be done in this department, yet a sufficiency has been accomplished, to point out the derivable advantages, and thereby stimulate cultivators to further exertions.

Annual Rye-grass.

The repeated saving of rye-grass seeds from first crops by the earlier growers, resulted, towards the end of the last century, in the prevalence of a short-lived variety, afterwards termed Annual Rye-grass, and unfit, in many cases, for the laying down of lands to two or more years' pasture, which naturally directed attention to the selection of a more lasting variety.

Peacy's Perennial Rye-grass.

Accordingly, we find that this desideratum was then supplied by Mr. Peacy of North Leach, Wiltshire, whose perennial rye-grass, as it is still called, soon became known throughout both Scotland and England.

Dickson's and other Perennial Rye-grasses.

Mr. Peacy's example was followed by many other cultivators, each of whom discovered, or fancied he had discovered, a variety possessing new or additional merits, so that, prior to the publication of the "Hortus Gramineus Woburnensis" in 1824, Dickson's, Ruck's, Russel's, Stickney's, Whitworth's, &c., had been introduced. And since that period, names of many other particular growers have been added to the list; so that it now requires no little discrimination to fix on what are really the most deserving of cultivation.

Evergreen Wood Meadow-grass.

About 1830, Mr. T. Bishop, at Methven Castle, Perthshire, brought out an evergreen variety of the wood meadow-grass,* and a long-leaved, deep-rooted variety of the hard fescue,† both of which he selected, in 1826, from observing the peculiar manner in which they withstood the severe drought of that summer;

Varieties of Hard Fescue.

and the same cultivator has since brought into notice three other varieties of the hard fescue, viz., an early,‡ a large purplish,§ and a large saw-leaved sort,‖ and has presently under experiment several seemingly much improved varieties of the timothy, foxtail, and others of the most valuable permanent grasses.

Double Yielding Sainfoin.

In 1833, we introduced from France the double yielding sainfoin,¶ a very luxuriant growing variety. In 1834, Mr. Gorrie, at Annat, discovered a

* Poa nemoralis *sempervirens*.
† Festuca duriuscula *Urii*.
‡ Festuca duriuscula *præcox*.
§ Festuca duriuscula *purpurata*.
‖ Festuca duriuscula *serrata*.
¶ Onobrychis sativa *bifera*.

fertile-seeded variety of the tall fescue-grass,* which he has since continued to propagate; and in 1840, we brought from Hamburgh a tall-growing or gigantic variety of the same plant. The tree clover from Bokhara,† a tall variety of white melilot, which attains a height of from 10 to 12 feet, created a little sensation in 1839, when first brought to this country, and still continues to be an object of attraction. In the following year, a very early but rather dwarf-growing variety of lucern from Affghanistan,‡ was received through the East India Company; and in 1841, we introduced from Hamburgh two strong growing grasses, the one a variety of cocksfoot,§ and the other of the wood meadow-grass‖.

Introduction of Varieties.

Fertile Tall Fescue. Bokhara Clover.

Affghanistan Lucern.

Gigantic Cocksfoot. and Wood Meadow-grasses.

In 1841, we received from the Botanic Gardens of Berlin, seeds of a very succulent and rapid-growing grass, under the name of Bromus Schraderi, which, on first trial, seemed to be possessed of highly important qualities, but was found too tender for the severe winter of 1844–45. In 1844, the bulbous barley grass¶ was noticed in the "Bon Jardinier" as being naturally well adapted for chalky and other dry calcareous soils, and has since been found to succeed on such in the south of England; for which localities the villous wheat-grass** was also recommended about the same time; but being of a diminutive growth, and only of biennial duration, its culture has not been attended with equal success.

Bromus Schraderi.

Bulbous Barley Grass.

Villous Wheat-grass.

In 1848, we procured from Mr. Cunningham, Comely Bank, some plants of the Pampas grass,†† described by Humboldt in the "Nova Genera et Species Plantarum." It is a strong coarse grass, growing in large tufts or tussocks, with leaves from eight to ten feet in length. As a fixer of loose sand-banks, or on the margins of rivers, it will probably prove useful; while its quick growth and hardy nature point it out as an excellent cover for game. Grows in very poor soils, if moist; but thrives most luxuriantly in a mixture of gravel, clay, and peat.

The extraordinary and unaccountable disparity in the quantities and proportions of grass seeds sown by different individuals, has often been noticed, as involving

Quantities of Grass Seeds sown per acre.

* Festuca elatior *fertilis*.
† Melilotus leucantha *major*.
‡ Medicago sativa *præcox*.
§ Dactylis glomerata *gigantea*.
‖ Poa nemoralis *gigantea*.
¶ Hordeum bulbosum.
** Triticum villosum.
†† Gynerium argenteum.

Quantities of Seed per Acre.

a question of considerable pecuniary importance, some of the earlier authors having recommended as much as 20 lbs. of each of the red, white, and yellow clovers, with half that weight of rib-grass, and 3 bushels of rye-grass per acre; while others asserted that one-fourth of that quantity was sufficient. Nor do present cultivators, in many instances, approach much nearer to a unanimity of practice. This being the case, in regard to the commoner grasses and clovers, a still greater uncertainty, as was to be expected, prevailed regarding the proper quantities and proportions of the comparatively recently introduced sorts. These circumstances induced us, in 1834, to lay before the public, through the medium of the "Quarterly Journal of Agriculture," a communication on the kinds and quantities of grass seeds suited to alternate husbandry, permanent pasture, pleasure grounds, &c., a revised copy of which we again published in our "Agriculturist's Manual" in 1836. As several sorts can now be had at reasonable rates, which were then little known, or so scarce and high-priced that their introduction, in proper quantities, would have unwarrantably heightened the price per acre for seeds, we have deemed it proper, at this time, again to submit to the attention of cultivators, the following further improved series of tables, which will be found to combine the results of continued experience with the latest introductions and improvements in practice. We trust they will not be the less acceptable to our friends at the present period, when an increased stimulus to the cultivation of the natural grasses has been effected by the now almost universal practice of frequent drainage, as well as by the alteration in the tariff, which admits the importation of seeds at a considerable reduction in duty; an alteration of the more importance, when it is considered that the greatest supplies and finest qualities of these seeds are derived from the Continent.

See Tables, pages 32-33.

The following short descriptions of the different grasses and other plants recommended in the tables have been appended, in hope that the information therein contained may be useful to cultivators who have not had opportunities of becoming acquainted with their characters and qualities.

As minute botanical descriptions of the various species would extend this publication beyond the assigned limits, and also prove uninteresting to the

Recent works on Agricultural Plants.

generality of cultivators, it may suffice to refer those desirous of obtaining a more perfect knowledge of the various cultivated species, to the "Agriculturist's Manual," and Dr. R. Parnell's publication on the "Grasses of Britain," a work not only replete both with practical and scientific information, but also illustrated with accurate engravings of all the native species, and their remarkable varieties. As, however, the author of that work has considered it expedient, in conformity with the present advanced state of the science of Botany, to subdivide several *genera*, and alter the names of various species, those which he has adopted are, in the following enumeration, added in brackets.

I.—TRUE GRASSES,

GENERALLY TERMED NATURAL GRASSES.

Descriptions of Natural Grasses recommended in Tables.

1. AGROSTIS STOLONIFERA; *Marsh Creeping Bent-grass*, or *Fiorin.*—A fibrous-rooted, stoloniferous, or creeping-stemmed perennial; flowers in July and August. Grows in peaty and other moist soils, by the sides of streams and rivulets, in marshes, wet pastures, and on the banks of rivers overflowed by fresh-water tides. A useful grass in those soils and situations where many of the more valuable sorts will not thrive.

2. AGROSTIS VULGARIS; *Common Fine Bent-grass*, or *Black Switch.*—A creeping-rooted perennial; flowers in June, July, and August. Grows on dry pastures, moors, waste grounds, in woods, &c.; is often a troublesome weed on elevated light lands, and is only useful for covering with verdure, poor, gravelly, or sandy soils, dry banks, and other places incapable of supporting more nutritious and useful grasses.

3. AIRA CÆSPITOSA; *Tufted Hair-grass.*—A fibrous-rooted, tufted, or bushy growing perennial; flowers in July. Grows naturally in moist, rich soils; disliked by cattle, and therefore esteemed a troublesome weed in pastures; is chiefly useful as cover in game preserves.

4. ALOPECURUS PRATENSIS; *Meadow Fox-tail Grass.*—A fibrous or slightly creeping-rooted perennial; flowers in May and June. Grows in rich,

Descriptions of Natural Grasses.

well-drained meadows and pastures; one of the earliest and best permanent pasture grasses.

5. AMMOPHILA ARUNDINACEA; *Sand Reed, Marrum,* or *Mat Grass.*—A creeping-rooted perennial; flowers in July. Grows naturally among shifting sea-sands, for the consolidating or fixing of which, it is peculiarly adapted by its strong creeping roots and hard elastic foliage.

6. ANTHOXANTHUM ODORATUM; *Sweet-scented Vernal Grass.*—A fibrous-rooted perennial; flowers in May and June. Grows in dry meadows, pastures, woods, and moors. One of the earliest spring grasses, and chiefly useful for imparting its peculiar sweet smell to permanent grass hay.

7. ARRHENATHERUM AVENACEUM; *Tall Oat-like grass,* or *French Rye-grass.*—A fibrous-rooted perennial; flowers in June and July. Grows in dry pastures, rocky and stony places, woods, &c. Yields a considerable bulk of a somewhat bitter-tasted herbage, of which cattle are rather unfond. Another reputed species, A. BULBOSUM, or *Knot Grass,* distinguished from this by having bulbous or knotted roots, is a well-known troublesome weed in corn-fields, especially in high districts.

8. AVENA FLAVESCENS [*Trisetum flavescens*]; *Yellowish Oat-grass.*—A fibrous-rooted perennial; flowers in July. Grows in rich dry pastures. An early and sweet grass, suited for light dry soils, but inferior to many others in bulk of produce.

9. BRACHYPODIUM SYLVATICUM [*Triticum sylvaticum*]; *Wood Fescue Grass.*—A fibrous-rooted perennial; flowers in July. Grows in dry shady woods. A coarse grass, not liked by cattle, but useful for forming an under covering of verdure in thick woods.

10. BROMUS GIGANTEUS [*Bucetum giganteum*]; *Giant Wood Brome-Grass.*—A fibrous-rooted perennial; flowers in July. Grows in moist shady woods; is used for similar purposes with the last, and is rather better liked by cattle.

11. CYNOSURUS CRISTATUS; *Crested Dog's-tail Grass.*—A fibrous-rooted perennial; flowers in July. Grows naturally in old pastures, on moist and dry, as well as heavy and light soils, but most abundant in pastures at low and

medium altitudes. Yields a scanty crop of herbage, but forms a fine turf, and is one of the best grasses for fine lawns.

12. DACTYLIS GLOMERATA; *Common Rough Cocksfoot* or *Orchard Grass.*—A fibrous-rooted perennial; flowers in June and July. Grows in meadows, pastures, bushy places, and waste grounds. One of the best and most productive pasture grasses, of which a strong growing variety has lately been brought into notice under the name of *Giant Cocksfoot.*

13. ELYMUS ARENARIUS; *Sea-Sand Lyme Grass.*—A creeping-rooted perennial; flowers in July and August. Grows among shifting or blowing sea-sands, for binding which, and thereby preventing the encroachments of the sea (along with No. 5), its numerous strong-spreading roots and coarse elastic foliage render it most suitable.

14. ELYMUS GENICULATUS; *Jointed-Sand Lyme Grass.*—Resembles the last in character and habits, except that its roots are less spreading; and being more prolific in its large oat-like seeds, which afford agreeable food for wild-fowl, it is further useful for sowing in dry and gravelly inland warrens and game preserves.

15. FESTUCA DURIUSCULA; *Hardish Fescue Grass.*—A fibrous-rooted perennial; flowers in June and July. Occupies a conspicuous place in superior dry sheep and other natural pastures; and, from its fine foliage retaining its green colour throughout the greater part of the year, it is further well adapted for sowing in ornamental lawns. Of this valuable species several improved varieties have of late been brought into notice; see page 20.

16. FESTUCA ELATIOR [*Bucetum elatius*]; *Tall Fescue Grass.*—A fibrous-rooted perennial; flowers in July. Grows on strong, rich, and rather moist soils, by banks of streams, shady places, &c. A very coarse reedy-like grass, but well liked by all domestic herbivorous animals. A selected, taller, and stronger variety than the common, is cultivated under the name of *Giant Fescue-grass.*

17. FESTUCA HETEROPHYLLA; *Various-leaved Fescue Grass.*—A fibrous-rooted perennial; flowers in June and July. This is an exotic species found in the central and southern countries of Europe, and, like No. 15, is adapted

Descriptions of Natural Grasses.

for superior rich, dry, permanent grass lands, especially such as are to be occasionally cut for hay, as it yields a greater weight of stems than any of the other fine-leaved fescues.

18. FESTUCA LOLIACEA [*Bucetum loliaceum*]; *Rye-grass* or *Darnel-spikea Fescue Grass.*—A fibrous rooted perennial; flowers in June and July. A good sort for moist or marshy alluvial soils and irrigated meadows.

19. FESTUCA OVINA; *Sheep's Fescue Grass.*—A fibrous-rooted perennial; flowers in June and July. Grows in all upland and very dry superior sheep pastures, retaining its verdure throughout winter, but is very deficient in comparison to No. 15, in bulk of crop.

20. FESTUCA PRATENSIS [*Bucetum pratense*]; *Meadow Fescue Grass.*—A fibrous-rooted perennial; flowers in June and July. Grows in rich meadows and superior pastures. A highly valuable species for permanent grass lands, combining most of the properties without the defects, of the *Lolium perenne*, No. 28.

21. FESTUCA RUBRA; *Reddish or Creeping-rooted Fescue Grass.*—Grows in light, dry, and sandy soils, for subsisting in which it is peculiarly fitted by its creeping roots, which chiefly distinguish it from No. 15.

22. FESTUCA TENUIFOLIA; *Fine-leaved Fescue Grass.*—A fibrous-rooted perennial; flowers in June and July. Grows in dry pastures, and differs from No. 19 in possessing a less-tufted habit of growth, which, with its fine evergreen and hard elastic foliage, renders it a very desirable sort for fine lawns, especially where these are cut by machine.

23. GLYCERIA AQUATICA [*Poa aquatica*]; *Water Sweet Meadow Grass.*—A creeping-rooted perennial; flowers in July and August. Grows in alluvial marshy soils, in slow running streams, margins of fresh-water lakes, &c. Yields an immense bulk of coarse, and by no means innutritious, herbage, but is apt, by its rapid growth, and powerfully creeping roots, to choke up ditches and small streams.

24. GLYCERIA FLUITANS [*Poa fluitans*]; *Floating Sweet-grass, Manna Grass,* or *Float Fescue.*—A fibrous rooted perennial; flowers in June, July, and August. Grows in alluvial marshes; also in and by the margins of shallow pools, slow running streams, and lakes. An early, very sweet, and nutritious

grass, well suited for irrigated meadows, and its seeds form an agreeable food for water-fowl and fresh-water fish.

25. HOLCUS LANATUS; *Yorkshire Fog, White Grass,* or *Woolly Soft Grass.*—A fibrous-rooted perennial; flowers in June and July. Grows in almost all soils and situations, but is generally considered as a weed in the better classes of pasture lands; consequently, only recommended for poor peaty and moorish soils, incapable of yielding in perfection the more nutritious and valuable grasses.

26. HOLCUS MOLLIS; *Creeping Soft Grass.*—A creeping-rooted perennial: flowers in July. Grows naturally in dry woods, bushy places, and waste grounds. Not liked by live stock, and only useful for sowing in wooded and barren dry or gravelly grounds.

27. LOLIUM ITALICUM [*Lolium perenne italicum*]; *Italian Rye-grass.*—A fibrous-rooted grass, of biennial or triennial duration; flowers in May and following month. A native of the southern countries of Europe, and, like the next species, is suited to a great variety of soils and situations. Yields early, bulky, and quickly succeeding crops of herbage, which renders it an invaluable grass for alternate husbandry; while its limited duration also fits it well for sowing in mixture with the other sorts intended for permanent pasture, as it dies out, and gives place to the weak and slow-maturing perennial sorts, which are destined ultimately to fill the ground.

28. LOLIUM PERENNE; *Common Rye-grass.*—A fibrous-rooted grass of biennial, triennial, or quadrennial duration; flowers in June and July. Grows naturally in meadows and rich pastures; and adapts itself under cultivation to a great variety of soils and situations. There are numerous varieties of this grass, differing in bulk of herbage and durability in the land; the more permanent being termed *Perennial,* and the less permanent *Annual.* None, however, are strictly perennial, while the term *annual* is equally fallacious. One of the most permanent varieties is, from the fineness of its foliage, termed *L. perenne tenue,* and is chiefly recommended for sowing in lawns.

29. MILIUM EFFUSUM; *Wood Millet Grass.*—A fibrous-rooted perennial; flowers in May and June. Grows on rich soils in moist shady woods. Yields

Descriptions of Natural Grasses.

an early and bulky crop of herbage, and produces a profusion of small millet-like seeds, which form an agreeable food for young pheasants and other granivorous fowls.

30. PHALARIS ARUNDINACEA; *Reed Canary Grass.*—A creeping-rooted perennial; flowers in July. Grows in alluvial marshy grounds, sides of rivers, lakes, ditches, and rivulets. A very strong-growing and coarse-like grass, but eaten with apparent relish by cattle and horses, especially when cut prior to flowering.

31. PHLEUM PRATENSE; *Timothy, Cat's-tail,* or *Herd Grass.*—A fibrous and bulbous- or knotted-rooted perennial; flowers in July. Grows in meadows and rich pastures. The most extensively cultivated of the true perennial grasses, being well adapted for either hay or pasture, and especially suited for improved peaty and moist soils.

32. POA NEMORALIS; *Wood Meadow Grass.*—A fibrous or slightly creeping-rooted perennial; flowers in June and July. Grows in woods, thickets, shady banks, and alpine rocks. A very superior grass for permanent pasture and lawns, as well as for affording a fine sward under trees. Several varieties of the wood-meadow-grass are in cultivation, of which the most important is the *P. nemoralis sempervirens,* or Hudson's Bay hay-grass, also known by the name of *P. nervosa,* which is distinguished by the rapidity with which it grows after being eaten or cut down, no less than by its perpetual verdure.

33. POA PRATENSIS.—*Smooth-stalked Meadow Grass.*—A creeping-rooted perennial; flowers in May and June. Grows in dry and gravelly soils, rocky places, tops of walls, &c.; a nutritious and very early grass, but its creeping roots render it only admissible in dry light soils, where others are liable to suffer from drought.

34. POA TRIVIALIS; *Rough-stalked* or *Stoloniferous Meadow Grass.*—A fibrous-rooted and creeping-stemmed perennial; flowers in June and July. Grows in moist pastures, meadows, waste grounds, shady places, &c. A highly nutritious and useful grass, deserving a place in all permanent mixtures, and is particularly suited, with Nos. 1 and 24, for irrigated meadows.

II.—CLOVERS AND OTHER PLANTS,

GENERALLY TERMED ARTIFICIAL GRASSES.

Descriptions of Artificial Grasses recommended in Tables.

1. ACHILLEA MILLEFOLIUM; *Yarrow* or *Common Milfoil.*—A fibrous-rooted perennial; flowers in June, July, and, occasionally, in the succeeding months. Grows in sandy links, dry pastures, &c.; is highly astringent, and greedily sought after by sheep.

2. CICHORIUM INTYBUS; *Chiccory* or *Succory.*—A deep rooting perennial; flowers in July. Grows in dry rich soils, and yields a great bulk, both of root and stem foliage, of which cattle are exceedingly fond. A variety, with large, somewhat carrot-shaped roots, forms the *chiccory* of commerce, used as a substitute for coffee.

3. LOTUS CORNICULATUS; *Common Birdsfoot Trefoil.*—A deep rooting perennial; flowers in June and July. Grows in sandy links, dry pastures, and moors. Eaten with avidity by horses, cattle, and sheep.

4. LOTUS MAJOR; *Greater Birdsfoot Trefoil.*—A spreading or creeping rooted perennial; flowers in July and August. Grows in moist meadows, banks of streams, and shady places. Possesses similar good properties with the last; yields a much greater bulk of herbage, and is suited for a more moist or marshy class of soils.

5. MEDICAGO LUPULINA; *Common Yellow Clover Trefoil; Nonsuch* or *Black Medick.*—A fibrous-rooted biennial or triennial; flowers from May to August. Grows in dry pastures and cultivated grounds. A well-known and extensively cultivated plant, but considered deficient in nutritive properties to the other commonly cultivated clovers, Nos. 12 and 14. Not a little misunderstanding has arisen regarding this plant, from the circumstance of early authors calling it *Hop Trefoil,* which name is now applied to the *Trifolium procumbens,* a much less useful plant, which grows on dry, light, and gravelly soils.

6. MEDICAGO SATIVA; *Lucern.*—A deep-rooting perennial; flowers in June and July. A native of the south of Europe, but now naturalized on chalky

Descriptions of Artificial Grasses.

and other calcareous soils in the south of England. Chiefly cultivated by itself, but may also be introduced in pastures in very dry limestone districts, as well as warrens and dry sandy links, particularly when the sand contains fragments of sea-shells or other calcareous matter.

7. ONOBRYCHIS SATIVA; *Sainfoin* or *Cinquefoil.*—A deep rooting perennial; flowers in July and August. Grows on light soils, and may be beneficially introduced under like circumstances as the last. A variety, known in France by the name of *O. sativa bifera,* is of more rapid growth, and attains to a larger size than the common.

8. PETROSELINUM SATIVUM; *Common Parsley.*—A somewhat fusiform rooting biennial or triennial; flowers in July. Grows on dry, warm, or light soils, and is recommended for sheep pastures as a preventative of the diseases called red water and rot.

9. PLANTAGO LANCEOLATA; *Common Plaintain* or *Rib-grass.*—A fibrous-rooted perennial; flowers in May and June. Grows in dry pastures and cultivated grounds. Formerly very much, and still occasionally, sown in upland pastures; although with questionable propriety, or only admissible, to a very limited extent, on improved moorlands.

10. POTERIUM SANGUISORBA; *Burnet.*—A fibrous-rooted sub-perennial; flowers in June and July. Grows best on calcareous soils, and may be sown on sandy links, &c., along with Nos. 6 and 7.

11. TRIFOLIUM MINUS *vel* FILIFORME; *Lesser Yellow Trefoil* or *Suckling Clover.*—A fibrous-rooted sub-perennial: flowers in May, June, and July. Grows on very dry pastures and poor sandy links. Too small to be of much importance in pastures, but forms an agreeable mixture in lawns, especially where the soil is too dry for white clover, No. 14.

12. TRIFOLIUM PRATENSE; *Common Red Clover.*—Too well known to require any description.

13. TRIFOLIUM PRATENSE *perenne; Cowgrass,* or *Perennial Red Clover.*—Is a more permanent variety of the last. Grows naturally in dry pastures, and is very suitable for sowing along with the permanent grasses, as also, in alternate husbandry, when two crops of pasture are taken.

Descriptions of Artificial Grasses.

14. TRIFOLIUM REPENS; *White* or *Dutch Clover*.—A well-known fibrous-rooted and creeping-stemmed perennial. Grows naturally in dry pastures and moors. Is an indispensable requisite in all pastures; but when too prevalent, has a tendency to scour cattle, besides occupying the ground which would otherwise be more profitably filled with the superior pasture grasses.

Weight of Seeds referrable to Measure.

It was formerly an almost universal practice to sow the grasses by *measure*, and the clovers by *weight;* but of late, the more judicious innovation of sowing *the whole by weight* has been successfully introduced; for although the greater weight in one sort is no criterion of its superiority over less weight in another, yet a greater weight in the same kind always denotes a superior quality. Thus, when seed is light, and consequently inferior, the greatest number of seeds is obtained by adhering to a given weight; and hence there is chance of nearly an equal number of plants springing up as when the seeds are plump and heavy. But a given weight or measure, applied to the seeds of different grasses, is no indication of the number of plants each sort will produce—there being material differences both in the relative bulk and specific gravities of such seeds, as well as a difference in the number of each, which germinate in a given quantity. In making out the tables, these variations have therefore been kept in view; and it has also been deemed useful, for the purposes of comparison, to subjoin a tabular statement, as follows, of the average weight per bushel of each of the kinds of seeds recommended, with the average number of seeds required to weigh one ounce:—

Weight of Seeds.

SCIENTIFIC NAMES. For English Names, see pages 23-31.	Average weight per bushel.	Average number of Seeds in one Ounce.	SCIENTIFIC NAMES. For English Names, see pages 23-31.	Average weight per Bushel.	Average number of Seeds in one Ounce.
	lb.			lb.	
Agrostis stolonifera	13	500,000	Lolium italicum	15	27,000
vulgaris	12	425,000	perenne, light-seeded varieties	18	16,000
Aira cæspitosa	14	132,000	heavy-seeded varieties	30	13,700
Alopecurus pratensis	5½	76,000	Milium effusum	25	95,000
Ammophila arundinacea	15	10,100	Phalaris arundinacea	48	42,000
Anthoxanthum odoratum	6	71,000	Phleum pratense	44	74,000
Arrhenatherum avenaceum	7	21,000	Poa nemoralis	15	173,000
Avena flavescens	5	118,000	*sempervirens*	15½	133,000
Brachypodium sylvaticum	10½	15,500	pratensis	13¼	243,000
Bromus giganteus	15	8,600	trivialis	15¼	217,000
Cynosurus cristatus	26	28,000			
Dactylis glomerata	11½	40,000	Achillea millefolium	29½	200,000
gigantea	10	34,000	Cichorium Intybus	32	21,000
Elymus arenarius	10	2,320	Lotus corniculatus	62	28,000
geniculatus	12	2,300	major	64	51,000
Festuca duriuscula	9½	39,000	Medicago lupulina	63¾	16,000
elatior	14	20,500	sativa	60	12,600
gigantea	13	17,500	Onobrychis sativa	26	1,280
heterophylla	12½	33,000	Petroselinum sativum	41	12,800
loliacea	15	24,700	Plantago lanceolata	51⅓	15,600
ovina	13½	64,000	Poterium Sanguisorba	24½	3,320
pratensis	13	26,000	Trifolium minus *vel* filiforme	64½	54,000
rubra	10	39,000	pratense	64	16,000
tenuifolia	13	88,000	*perenne*	64	16,000
Glyceria aquatica	13½	58,000	repens	65	32,000
fluitans	14½	33,000			
Holcus lanatus	7	95,000			
mollis	6	85,000			

It must, however, be kept in view, that, even under the most careful management, a great proportion of the plants produced by the smaller seeds perish at, or immediately after, the period of brairding, than of the more robust produce of the larger seeds; while a considerable number of the former become entirely lost in consequence of an overdepth of covering, as exemplified in the following table, which is copied from a communication by J. D. Stirling, Esq. of Glenbervie, published in vol. 15 of the "Prize Essays and Transactions of the Highland and Agricultural Society," 1844, on the results of experiments to prove the best depth of cover for certain grasses and clovers.

No. 1, Depth of Cover ¼ Inch.				No. 2, Depth of Cover from 0 to 3 Inches.													Proper Depth for Sowing Seed.
Weight Sown.	Average lineal Inch.	Kind of Plant Experimented on.	Total of each kind.	0 to ¼ Inch deep.	¼ to ½ Inch ...	½ to ¾ Inch ...	¾ to 1 Inch ...	1 to 1¼ Inch ...	1¼ to 1½ Inch ...	1½ to 1¾ Inch ...	1¾ to 2 Inches ...	2 to 2¼ Inches ...	2¼ to 2½ Inches ...	2½ to 2¾ Inches ...	2¾ to 3 Inches ...	Total of each kind	
gr																	
8	29	*Lolium perenne* (Perennial Rye-grass)	348	29	30	27	19	16	19	14	12	11	9	8	4	198	
15	23	-- *italicum* (Italian Rye-Grass)	276	24	21	20	13	13	10	11	8	9	6	5	5	145	
7	25	*Dactylis glomerata* (Cock's-foot)	300	30	22	15	15	10	9	7	5	2	..	..	..	115	
13	26	*Festuca elatior* (Larger Fescue)	312	29	24	20	16	13	13	11	9	4	2	1	..	142	
9	27	-- *pratensis* (Meadow do.)	324	28	28	16	12	10	6	9	4	2	2	..	..	117	
6	29	-- *heterophylla* (Various leaved do.)	348	31	23	20	18	12	9	6	4	1	..	..	..	124	
6	30	-- *duriuscula* (Hard do.)	360	30	23	10	15	10	8	5	3	1	..	..	..	114	
13	16	*Alopecurus pratensis* (Meadow Fox-tail)	192	17	17	16	15	12	7	6	3	1	..	..	..	94	
3	44	*Phleum pratense majus* (Timothy Grass)	528	52	39	37	19	16	15	7	5	..	..	..	..	190	
9	19	*Poa nemoralis sempervirens* (Evergreen Wood Meadow-Grass)	228	24	14	4	1	..	..	..	..	..	..	..	..	43	
6	21	*Platago lanceolata* (Rib-Grass)	252	22	25	19	17	14	11	10	8	6	2	..	..	134	
4	16	*Trifolium pratense* (Red Clover)	192	17	16	14	11	11	8	4	4	..	..	..	..	85	
3	12	-- *repens* (White do.)	144	13	11	6	4	3	1	..	..	..	..	..	..	38	
10	8	*Medicago lupulina* (Yellow do.)	96	12	10	8	6	4	2	..	..	..	..	..	..	42	
	325	Totals	3900	358	303	241	181	144	118	90	65	37	21	14	9	1581	

Sown 1*st July*, *Counted* 1*st August* 1844.

To give a series of tables comprehending all the variations of soils, altitudes, climates, and other circumstances, which may present themselves in course of practice, would be inexpedient, and almost impossible; but the following will be found to embrace the different purposes for which lands are generally sown down with grasses, as well as the most distinct classes of soils under culture. Further, judgment and discrimination must, however, in many instances, be exercised, both in regard to the kinds and quantities of seeds to be sown. Thus, it may be ex-

Variations from Tables.

pedient, in particular cases, to withdraw, wholly or partly, certain kinds, and to substitute others, especially where lands are known naturally to produce any particular sort, which, although desirable to a certain extent, may, when too predominant, prove rather detrimental to the crop than otherwise. And it is also very material to keep in view the altitude, exposure, and any other peculiarities which may present themselves in the constitution of the land: as whether the soil or subsoil be naturally moist or dry, and whether it be of a calcareous, ferruginous, peaty, or other nature, at all likely to affect the growth of certain species or varieties of the grasses, clovers, and other plants recommended in the tables.

Sowing with and without a Crop.

It is not our purpose here to discuss the question, as to whether it is better to sow grass seeds for permanent pasture with or without a corn crop. Both systems have their advocates, as well as their advantages and defects, and depend, in a great measure, on the varied circumstances which present themselves in practice. Therefore, in the following tables, separate columns are given for each of these methods; it being always expedient to sow a somewhat larger portion of seeds without than with a corn crop: and in that case, it is further advisable, for affording shelter to the young plants, to add a bushel of rye to the mixture, when sown in autumn, and a bushel of barley, when sown in spring—to be depastured or cut green along with the young grass crop.

KINDS AND QUANTITIES OF GRASS SEEDS REQUIRED FOR SOWING THE IMPERIAL ACRE.

I.—FOR ALTERNATE HUSBANDRY.

Table I.

SCIENTIFIC NAMES. For English Names, see pages 23—31.	LIGHT AND MEDIUM SOILS.			HEAVY SOILS.				LIGHT AND MEDIUM SOILS.			HEAVY SOILS.		
	For one year's Hay.	For one year's Hay, and one year's Pasture.	For one year's Hay, and two years' Pasture.	For one year's Hay.	For one year's Hay, and one year's Pasture.	For one year's Hay, and two years' Pasture.		For one year's Hay.	For one year's Hay, and one year's Pasture.	For one year's Hay, and two years' Pasture.	For one year's Hay.	For one year's Hay, and one year's Pasture.	For one year's Hay and two years' Pasture.
	lb.	lb.	lb.	lb.	lb.	lb.		lb.	lb.	lb.	lb.	lb.	lb.
Lolium italicum	6	6	6	6	6	6	Or,	--	--	--	--	--	--
perenne	10	10	10	10	10	10		18	18	18	18	18	18
Phleum pratense ..	--	1	1	1	2	2		--	1	1	1	2	2
Medicago lupulina ..	1	2	2	1	2	2		1	2	2	1	2	2
Trifolium pratense ..	8	4	3	8	4	3		8	4	3	8	4	3
perenne	--	2	3	--	2	3		--	2	3	--	2	3
repens	2	4	4	2	4	4		2	4	4	2	4	4
	27	29	29	28	30	30		29	31	31	30	32	32

The second division of the above table is given in deference to a by no means unprevalent prejudice against the introduction of Italian Rye-grass, which, in many instances, may be traced to its presence being attended with an additional cost for seed of from 2*s.* 6*d.* to 3*s.* per acre. For three years' pasture on good soils, the substitution of 2 lb. of *Dactylis glomerata* for about 3 lb. of *Lolium perenne* in both of the above mixtures, will be found advantageous; while in sheep-pastures, the addition of 1 lb. per acre of parsley seed would also be attended with good results; and in certain upland districts, established practice will point out the introducing of 2 lb. or 3 lb. per acre of Rib-grass. In proportion to the retentiveness of very heavy soils, as well as for those of a peaty nature, *Phleum pratense* should also be increased from ½ lb. to 1½ lb. additional.

Table II.

II.—No. 1. FOR PERMANENT PASTURE.

SCIENTIFIC NAMES. *For English Names, see pages 23—31.*	LIGHT SOILS.		MEDIUM SOILS.		HEAVY SOILS.	
	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.
	lb	lb	lb	lb	lb	lb
Alopecurus pratensis . .	1	1¼	1¼	1½	1½	1¾
Dactylis glomerata . .	3	3½	4	5	4	5
Festuca duriuscula . .	2	2	2	2½	2½	3
elatior	—	—	1	1½	2	2½
pratensis . . .	2	3	2	3	2	3
rubra	1½	2	—	—	—	—
Lolium italicum	5	6	5	6	5	6
perenne	8	9	8	9	8	9
Phleum pratense . . .	1	1	2	2½	2½	3
Poa nemoralis	1	1	1	1	1	1
sempervirens	1	1	1	1	1	1
pratensis	1	1½	—	—	—	—
trivialis	—	—	1½	2	2	2½
Medicago lupulina . . .	1	1	1	1	1	1
Trifolium pratense . . .	1	1	1	1	1	1
perenne	2	2	2	2	2	2
repens . . .	4	5	4	5	4	5
If sown without a crop, see page 34.	34½	40¼	36¾	44	29½	46¾

The above table is drawn out with a view to the strictest economy in the original outlay. The one following will be found to contain a greater proportion of the more valuable sorts of seeds; and although these will add from 2*s*. 6*d*. to 5*s*. per acre to the first expense, yet the improvement in the produce will generally much more than compensate for the additional primary cost.

In certain cases the following additions to both tables, II.—1, and II.—2, may be made, viz.: ½ lb. *Achillea millefolium*, in dry sheep pastures; 2 lb. *Cichorium Intybus*, in cattle pastures; 6 lb. to 10 lb. *Onobrychis sativa*, on dry calcareous soils; 1 lb. to 2 lb. *Petroselinum sativum*, in lands where sheep are subject to the rot. When a crop of hay is taken the first year, both *rye-grasses* may be increased one-fifth, and 2 lb. *Trifolium pratense* added. Also ½ lb. per acre of *Anthoxanthum odoratum*, where occasional crops of hay are to be taken.

II.—No. 2. FOR PERMANENT PASTURE.

Table. II.

SCIENTIFIC NAMES. *For English Names, see pages 23—31.*	LIGHT SOILS.		MEDIUM SOILS.		HEAVY SOILS.	
	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.
	lb	lb	lb	lb	lb	lb
Alopecurus pratensis	1	1½	1½	1½	1½	1¾
Avena flavescens	0¾	0¾	0½	0½	—	—
Dactylis glomerata	3	4	3	4	3	4
Festuca duriuscula	2	2	2	2	2	2
elatior	—	—	1	1	2	2
heterophylla	—	—	1	1	1	1
pratensis	2	2	2½	2½	3	3
rubra	2	2	—	—	—	—
Lolium italicum	5	6	5	6	5	6
perenne	6	7	6	7	6	7
Phleum pratense	1	1¼	1¾	2	2	2¼
Poa nemoralis	0¾	1	1	1½	1½	1½
sempervirens	0¾	1	1	1½	1½	1½
pratensis	1	1	—	—	—	—
trivialis	—	—	1½	2	2	2½
Lotus corniculatus	0½	0½	0½	0½	—	—
major	—	—	0¼	0½	0½	0½
Medicago lupulina	1	1	1	1	1	1
Trifolium pratense	1	1	1	1	1	1
perenne	2	2	2	2	2	2
repens	4	5	4	5	4	5
If sown without a crop, see page 34.	33¾	38¾	36	41½	38½	44

The remarks attached to Table II. Nos. 1 and 2, are likewise applicable to Table III. Nos. 1 and 2, except that *Cichorium Intybus* should in all cases be excluded, and *Onobrychis sativa* at least lessened one-half, their foliage being coarse and unsightly. On warm dry banks, cowslip seed (*Primula veris*) may be scattered at the rate of from a quarter to half a pound per acre; and on such parts as are overshadowed by trees, a further quantity of *Poa nemoralis*, and its variety, *sempervirens*, should be added; while on very dry banks

Table III.

III.—No. 1. FOR PERMANENT LAWN PASTURES.

In Lawns or Ornamental Parks, it is generally desirous to have a predominance of the finer evergreen grasses, which has been strictly attended to in the following tables:—

SCIENTIFIC NAMES. *For English Names, see pages 23-31.*	LIGHT SOILS.		MEDIUM SOILS.		HEAVY SOILS.	
	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.
	lb	lb	lb	lb	lb	lb
Alopecurus pratensis	1	1½	1½	1½	1½	1¾
Anthoxanthum odoratum	0½	0½	0½	0½	0½	0½
Avena flavescens	0½	0½	0½	0½	—	—
Dactylis glomerata	2	2	2	2	2	2
Festuca duriuscula	2½	3	2½	3	2½	3
ovina	1	1	1	1	1	1
pratensis	2	2	3	3	3	3
rubra	1	1	—	—	—	—
Lolium italicum	4	5	4	5	4	5
perenne	7	8	7	8	7	8
Phleum pratense	1	1	1½	1½	2	2
Poa nemoralis	1	1½	1½	1½	1½	1¾
sempervirens	1	1½	1½	1½	1½	1¾
trivialis	1	1½	1½	2	2	2½
Lotus corniculatus	0½	0½	0½	0½	—	—
major	—	—	0½	0½	0½	0½
Medicago lupulina	1	1	1	1	1	1
Trifolium pratense	1	1	1	1	1	1
perenne	1	1	1	1	1	1
repens	4	5	4	5	4	5
If sown without a crop, see page 34.	33	37¾	34¾	39½	36	40¾

the additional introduction of from one to two pounds of *Trifolium filiforme;* as also one pound each of *Agrostis vulgaris*, *Poa pratensis*, and the deeper rooting varieties of *Festuca duriuscula*, or *F. rubra*, would prove a guarantee against the destruction of the pasture by severe droughts.

III.—No. 2. FOR PERMANENT LAWN PASTURE.

Table III.

SCIENTIFIC NAMES. *For English Names, see pages 23-31.*	LIGHT SOILS.		MEDIUM SOILS.		HEAVY SOILS.	
	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.
	lb	lb	lb	lb	lb	lb
Alopecurus pratensis . .	1	1½	1½	1½	1½	1¾
Anthoxanthum odoratum .	0½	0½	0½	0½	0½	0½
Avena flavescens . . .	1	1	0½	0½	—	—
Dactylis glomerata . . .	1½	2	1½	2	1½	2
Festuca duriuscula . . .	2	2	2½	3	2½	3
heterophylla . .	—	—	1	1	1½	1½
ovina	1	1	1	1	1	1
pratensis	2	2	3	3	3	3
rubra	1	1	—	—	—	—
Lolium italicum	4	5	4	5	4	5
perenne	5	6	5	6	5	6
Phleum pratense . . .	1	1	1½	1½	2	2
Poa nemoralis	1	1½	1½	1½	1½	1¾
sempervirens	2	2½	2½	3	3	3½
trivialis	1	1½	1½	2	2	2½
Lotus corniculatis . . .	0½	0½	0½	0½	—	—
major	—	—	0½	0½	0½	0½
Medicago lupulina . . .	1	1	1	1	1	1
Trifolium pratense *perenne*	2	2	2	2	2	2
repens . . .	4	5	4	5	4	5
If sown without a crop, see page 34.	31½	36½	34½	40	36½	42

Table IV.

IV.—FOR FINE LAWNS, BOWLING-GREENS, &c., KEPT CONSTANTLY UNDER THE SCYTHE.

SCIENTIFIC NAMES. *For English Names, see pages 24—31.*	LIGHT SOILS.		MEDIUM SOILS.		HEAVY SOILS.	
	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.
	lb	lb	lb	lb	lb	lb
Avena flavescens . . .	1	1	—	—	—	—
Cynosurus cristatus . . .	5	5	6	6	7	7
Festuca duriuscula . . .	3	3	3	3	4	4
tenuifolia . . .	2	2	2	2	1	1
Lolium perenne *tenue* . .	18	20	18	20	18	20
Poa nemoralis	1½	1½	1½	1¾	1¾	2
sempervirens	1½	1½	1½	1¾	1¾	2
trivialis	1½	1½	1½	1¾	1¾	2
Trifolium repens . . .	6	7	6	7	6	7
minus	2	2	2	2	1	1
If sown without a crop, see page 34.	40¾	44½	41½	45½	42½	46

In cases where primary expense is deemed secondary to ultimate effect, two pounds of the Evergreen Wood Meadow-grass may be added to each of the above columns; and where the ground is shaded by trees, both *Poa nemoralis* and that variety should be substituted for similar quantities of the two *Fescues*, such quantities being dependent on the extent and depth of the shade.

In walks, bowling-greens, &c., which are wished to be kept as dry as possible, especially towards the end of the season, *Trifolium repens* should be sparingly introduced; and when it is intended to mow the grass by machine, instead of the common scythe, greater proportions of the hard and fine-leaved *Fescues* may be sown.

V.—FOR LANDS IN PREPARATION FOR IRRIGATION.

Table V.

SCIENTIFIC NAMES. *For English Names, see pages 23—31.*	LIGHT SOILS.		MEDIUM SOILS.		HEAVY SOILS.	
	With a Crop.	Without a Crop	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.
	lb	lb	lb	lb	lb	lb
Agrostis stolonifera . . .	2	2¼	2½	2½	2½	2¾
Alopecurus pratensis . .	1	1¼	1½	1½	1½	1¾
Festuca loliacea . . .	1	1	2	2	2½	3
pratense . . .	2	2½	2	2½	2	2½
elatior . . .	1½	1½	2	2	2	2
Glyceria fluitans . . .	2	2¼	2½	2½	2½	2¾
Lolium italicum	5	6	5	6	5	6
perenne	6	7	6	7	6	7
Phalaris arundinacea . .	1	1	1½	1½	1½	1½
Phleum pratense . . .	2	2	2½	3	3	3½
Poa trivialis	2½	2¾	2¾	3	3	3½
Lotus major	2	2	2	2	2	2
If sown without a crop, see page 34.	28	31½	31¼	35½	33½	38

When desirable, the original expense of the above mixture may be decreased a few shillings per acre, by excluding the *Alopecurus pratensis* (which is only recommended in consideration of its earliness), and half of the *Lotus major;* under most circumstances, however, it will be advisable to retain the full quantity of the latter, not only from its being the best adapted of the clover tribe for withstanding excess of moisture, but also from its attaining to full maturity at a late period of the season, when the growth of the grasses generally becomes less vigorous.

Table VI.

VI.—FOR PERMANENT PASTURE AND HAY IN ORCHARDS AND OTHER GROUNDS MUCH OVERSHADED BY TREES.

SCIENTIFIC NAMES. *For English Names, see pages 23—31.*	LIGHT SOILS.		MEDIUM SOILS.		HEAVY SOILS.	
	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.	With a Crop.	Without a Crop.
	lb.	lb.	lb.	lb.	lb.	lb.
Anthoxanthum odoratum	1	1	1	1	1	1
Dactylis glomerata	5	6	6	7	6	7
Festuca duriuscula	1	1	1	1	1	1
elatior	—	—	1	1½	2	2½
Lolium italicum	4	5	4	5	4	5
perenne	5	6	5	6	5	6
Milium effusum	1	1	1	1	1	1
Phleum pratense	1	1	1½	1½	2	2
Poa nemoralis	1	1	1½	1½	1½	1½
sempervirens	2	2	2½	2½	3	3
trivialis	1	1	1½	1½	1½	1½
Lotus major	1	1	1½	1½	1½	1½
Trifolium pratense *perenne*	2	2	2	2	2	2
repens	3	3	3	3	3	3
If sown without a crop, see page 34.	28	31	31⅔	35½	34½	38

The high price of *Milium effusum*, consequent upon its recent introduction, may, in particular instances, render its exclusion from the above mixture expedient. And where the appearance of coarse growing grasses is objectionable, *Dactylis glomerata*, *Festuca elatior*, and *Phleum pratense*, may either be lessened in quantity or entirely excluded, and substituted by an increase of about two-thirds of their weight of *Festuca duriuscula*, and the *three sorts of Meadow-grass*.

VII.—FOR PASTURAGE AND COVER IN THICK SHADY WOODS AND PLANTATIONS.

Table VII.

SCIENTIFIC NAMES. *For English names, see pages* 23—31.	LIGHT SOILS.	MEDIUM SOILS.	HEAVY SOILS.
	lb.	lb.	lb.
Agrostis vulgaris . . .	1	1½	1½
Aira cæspitosa	1½	1½	2
Arrhenatherum avenaceum	3	4	5
Brachypodium sylvaticum	1½	1¾	2
Bromus giganteus . . .	3	3	3
Dactylis glomerata . . .	4	5	6
Festuca elatior	2	2	2
Holcus mollis	1	1½	2
Milium effusum	1	1	1
Phleum pratense . . .	1	1½	1½
Poa nemoralis	2	2	2
sempervirens	2	2	2
trivialis	2	2	2
Lotus major	2	2	2
	26¾	30½	34

The remarks appended to the last table, relative to *Milium effusum*, apply also in the case of this; but where it is desirable to introduce it extensively, for feeding game with its seeds, the most successful and economical method is, first, to rear the young plants in nursery or garden ground, and then transplant them, by dibber or otherwise, to situations most suited for their growth.

When the chief object to be attained is a grassy game cover, under very thick trees, the quantities of *Aira cæspitosa*, *Arrhenatherum avenaceum*, *Brachypodium sylvaticum*, and *Bromus giganteus*, should be increased, and *vice versa*.

Table VIII.

VIII.—FOR HEATHY AND MOORY LANDS WHICH HAVE BEEN IMPROVED WITH A VIEW TO THEIR PRODUCING BETTER PASTURAGE.

SCIENTIFIC NAMES. *For English Names, see pages 23—31.*	With a Crop.	Without a Crop.	Or,	With a Crop.	Without a Crop.
	lb.	lb.		lb.	lb.
Arrhenatherum avenaceum .	3	4		3	4
Holcus lanatus	2	2½		2	2½
Lolium italicum	4	5		—	—
Phleum pratense	2	2½		2	2½
Medicago lupulina . . .	2	2		2	2½
Trifolium repens	4	5		4	5
Mixed Hay Seeds . . .	11	13		18	20
If sown without a Crop, see page 34.	28	34		31	36

This class of lands will rarely afford anything more than a very cheap mixture of seeds, such as the above. When, however, the soil is of a moist peaty nature, the quantity of *Phleum pratense* should be increased, and from 1 to 1½ lb of *Agrostis stolonifera* added. And when they are of a dry nature, and high altitude, the introduction of 2 lb of *Festuca duriuscula*, and 2 lb *F. ovina*, per acre, would be found of material advantage, especially for sheep pastures. In addition to which it is also the practice, in some districts, to introduce a few pounds of *Plantago lanceolata*.

IX.—FOR IMPROVED DEEP MOSSY GROUND, INTENDED TO BE KEPT IN GRASS.

Table IX.

SCIENTIFIC NAMES. *For English Names see pages 23—31.*	With a Crop.	Without a Crop.		With a Crop.	Without a Crop.
	lb.	lb.		lb.	lb.
Agrostis stolonifera . . .	1½	1⅔		1½	1⅔
Alopecurus pratensis . . .	0½	0½		0½	0½
Festuca duriuscula	3	3½		3	3½
pratensis	1	1		1	1
Lolium italicum	4	5	Or,	—	—
perenne	6	8		12	14
Phleum pratense	3	4		3	4
Poa trivialis	2	2½		2	2½
Lotus major	1½	1½		0½	0½
Medicago lupulina	2	2		2	2
Trifolium pratense *perenne* .	1	1		1	1
repens	4	5		4	5
And 1 *bushel Rye or Barley, when sown without a crop. See page* 34.	29½	35⅔		30½	35⅔

Where such grounds are subject to occasional overflowings by water, it will be expedient to add 2 or 3 lb. of *Glycera fluitans*, and increase the quantities of *Agrostis stolonifera*, *Phleum pratense*, *Poa trivialis*, and *Lotus major*; in which case a proportionate decrease should be made in the seeds of *Lolium italicum*, *L. perenne*, and *Trifolium pratense*.

Table X.

X.—FOR MARSHY GROUNDS, AND THOSE OCCASIONALLY OVERFLOWED BY FRESH-WATER TIDES, &c.

SCIENTIFIC NAMES. *For English Names, see pages 23—31.*	ALLUVIAL SOILS.	PEATY SOILS.
	lb.	lb.
Agrostis stolonifera	2	4
Festuca elatior	3	2
loliacea	3	3
Glyceria aquatica	5	2
fluitans	5	5
Phalaris arundinacea	2	1
Phleum pratense	2	3
Poa trivialis	3	4
Lotus major	2	2
	27	26

For banks of rivers, subject to occasional overflowings, but where the soil is of a dry porous nature, on an open gravelly subsoil, a mixture approximating to that in Table II. may be used; and the more aquatic grasses, as *Glyceria fluitans*, *G. aquatica*, and *Phalaris arundinacea*, excluded. The two last of these are, however, very useful for preventing the encroachment of rivers or streams on alluvial haughs, &c.